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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of	)	
	)	
Amendment of Part 90	)	PR Docket No. 93-61
of the Commission's Rules	)	
to Adopt Regulations for	)	
Automatic Vehicle Monitoring	)	
Systems	)	

REPLY COMMENTS OF AMTECH CORPORATION TO COMMENTS ON EX PARTE PRESENTATIONS

AMTECH Corporation ("AMTECH"), by its attorneys, hereby replies to the comments filed in response to the Commission's February 9, 1994, Public Notice[1] in the above-captioned proceeding.

The major thrust of the comments concerns the use of the 902-928 MHz band by wide-area automatic vehicle monitoring ("AVM") systems. Nevertheless, some of the commenters raise issues of concern to local-area system operators, which AMTECH will address in these reply comments. Specifically:

- AMTECH continues to believe that, of the plans suggested in this proceeding, its proposed Band Plan B is the most accommodating to the AVM industry as a whole. In addition, however, PacTel Teletrac's ("PacTel's") *ex parte* proposal could be tolerable if modified as suggested in AMTECH's earlier comments in response to the Public Notice.[2] The revised MobileVision, L.P. ("MobileVision") band plan and the Southwestern Bell Mobile Services ("SBMS") plan fail to meet the spectrum needs of a wide variety of local-area operations.

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[1] Regulations for Automatic Vehicle Monitoring Systems, Public Notice, DA 94-129, 59 Fed. Reg. 7239 (Feb. 15, 1994).

[2] Comments of AMTECH Corporation on Ex Parte Presentations, PR Docket No. 93-61 (filed March 15, 1994) [hereinafter AMTECH Ex Parte Comments].

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- MobileVision's attack on the experiment conducted by AMTECH and Pinpoint Communications, Inc. ("Pinpoint") demonstrating the compatibility of local-area and wide-area AVM systems disingenuously confuses detection of another system's signal with destructive interference and otherwise relies on erroneous assumptions.

- The record fails to support a conclusion that local-area AVM/LMS systems and Part 15 devices operating in the same band are not compatible.

I. AMTECH REMAINS CONVINCED THAT ITS BAND PLAN PROPOSAL IS THE MOST EFFICIENT AND WILL BEST SERVE THE PUBLIC INTEREST

After reviewing the comments filed in response to the *ex parte* submissions, AMTECH remains convinced that its proposed Band Plan B[3] is the most efficient and will best serve the public interest by accommodating the spectrum requirements of both wide-area and local-area AVM systems. In brief, under this proposal the entire 902-928 MHz band would be shared by both wide-area and local-area systems in a manner currently in place in the two AVM sub-bands (904-912 and 918-926 MHz). In addition, two 4 MHz "quiet zones" would be created at 906-910 MHz and 920-924 MHz to accommodate wide-area systems that are less tolerant of co-channel interference, in which local-area operations would be subject to strict power limitations.[4] AMTECH's Band Plan B also satisfies the needs of local-area operators with

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[3] *See* Comments of AMTECH Corporation, PR Docket No. 93-61, at 28-31 (filed June 29, 1993) [hereinafter AMTECH Rule Making Comments].

[4] In its comments filed in response to the Commission's NPRM, AMTECH also proposed a band plan it called Band Plan A. Under this proposal, the entire 902-928 MHz band would be shared by all AVM/LMS system types, with uniform power limits applying throughout the band for local-area systems. AMTECH Rule Making Comments at 17-27. The proposal advanced by Mark IV IVHS Division ("Mark IV") urging the Commission to give public service users of local-area systems co-primary status in the 904-912 MHz band is roughly consistent with this proposal. *See* Comments of Mark IV IVHS Division, PR Docket No. 93-61, at 7-8 (filed March 15, 1994). AMTECH believes, however, that its proposed Band Plan B may better accommodate the operation of certain wide-area systems less tolerant of interference while still meeting the local-area system needs identified in Mark IV's comments.

requirements for numerous reader frequencies by giving them primary access to a sufficient quantity of spectrum -- 18 MHz. Similarly, AMTECH's proposal permits the efficient operation of innovative high-data-rate, read-write local-area systems, such as that envisioned by the State of California, by allowing for three 6 MHz channels with 10 MHz spacing from channel center to channel center.[5]

The *ex parte* band plan proposals presented by PacTel and SBMS are detrimental to the public interest because they fail to accommodate the needs of local-area systems, as AMTECH explained in its Ex Parte Comments.[6] MobileVision, in its comments, submitted a slightly revised band plan proposal which is similarly injurious to local-area operations. Specifically, MobileVision proposed a band plan comprised of a contiguous 10 MHz band at 910-920 MHz for local-area systems and two 8 MHz bands at 902-910 and 920-928 MHz for wide-area use.[7] MobileVision's proposal would be extremely deleterious to many local-area operations because it gives local-area systems 40 percent less spectrum than currently available under the Commission's Rules,[8] and even less spectrum relative to AMTECH's proposed Band Plan B.

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[5] *See* AMTECH Ex Parte Comments at 3-4. As discussed at length in AMTECH's Rule Making Comments, the reliable operation of high-data-rate local-area systems such as that conceived by the California Department of Transportation requires three 6 MHz bands with an appropriate amount of frequency separation for effective operation. AMTECH Rule Making Comments at 10-13.

[6] AMTECH Ex Parte Comments at 8-11.

[7] Further Comments of MobileVision, L.P, PR Docket No. 93-61, at 30-31 (filed March 15, 1994).

[8] MobileVision's assertion that only wide-area systems are properly licensed in the 904-912 and 918-926 MHz sub-bands under the current rules has been rejected. *See* In re BP Oil Company Application for Private Land Mobile and General Mobile Radio Services *et al.*, 8 FCC Rcd 7320, 7321 (1993) (Order) *appeal pending sub nom.* North American Teletrac and Location Technologies, Inc. v. FCC, (No. 93-1745) (D.C. Cir. filed Nov. 12, 1993). Notably, the Court of Appeals, on January 24, 1994, denied PacTel's request to stay the effectiveness of the local-area system licenses at issue in the Commission's Order. PacTel had argued that the local-area licenses violate the current rules.

In addition, reliable operation of high-data-rate local-area systems utilizing more than one 6 MHz channel would be rendered nearly impossible.

In short, AMTECH's proposed Band Plan B is the proposal that best serves the public interest because it allows the efficient operation of both wide-area and local-area AVM/LMS systems. As discussed in AMTECH's earlier comments, however, PacTel's *ex parte* proposal could also be acceptable to local-area systems if modified in accordance with AMTECH's suggestions, which include among other things: (1) allowing local-area systems to attenuate side-bands of wideband emissions into the spectrum below 912 MHz; and (2) moving the forward links either out of the 902-928 MHz band altogether, into the wide-area sub-band (902-912 MHz), or to the top-most 0.5 MHz of the 902-928 MHz band.[9] To safeguard the efficient operation of local-area systems, AMTECH's suggestions must be incorporated if the Commission adopts the PacTel *ex parte* proposal.

II. MOBILEVISION'S CRITIQUE OF THE EXPERIMENT CONDUCTED BY PINPOINT COMMUNICATIONS, INC. DEMONSTRATING THE COMPATIBILITY OF THE PINPOINT AND AMTECH AVM SYSTEMS IS FUNDAMENTALLY FLAWED

AMTECH-equipped systems are very compatible with other users in the shared 902-928 MHz band. There are over 1000 AMTECH reader installations in this country, and these have never suffered harmful interference from another licensed system or Part 15 device. On the two occasions when AMTECH-equipped systems allegedly caused interference to another licensed system of which AMTECH is aware, the problems were resolved satisfactorily.

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[9] AMTECH Ex Parte Comments at 9-11. For a complete discussion of AMTECH's suggestions, see AMTECH Ex Parte Comments at 9-11.

To underscore the practicality of continued licensing on a shared spectrum basis, AMTECH and Pinpoint Communications, Inc., a wide-area system licensee that has consistently stressed the need for sharing between wide-area and local-area systems, jointly tested their systems in Washington, D.C., in the summer and fall of 1993. The results of this experiment were described in "Review and Discussion of the Pinpoint ARRAY Network and Its Performance," a report prepared by Hatfield Associates, Inc. ("Hatfield Report"), which was filed with the Commission on January 24, 1994.[10]

Briefly stated, neither system suffered serious interference from the other despite testing conditions designed to maximize the potential for interference between the two systems under normal operating conditions. MobileVision challenges the results of these tests, suggesting that, despite the conclusions of AMTECH and Pinpoint that co-channel operation of their two systems presents little difficulty, sharing between the two systems is not practical.[11] MobileVision's analysis is flawed in two fundamental respects.

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[10] Pinpoint Communications, Inc., Ex Parte Presentation, PR Docket No. 93-61 (filed January 24, 1994).

[11] Most interestingly, MobileVision avers that the type of interference experienced by Pinpoint from AMTECH's local-area system is worse than that all other wide-area AVM systems would encounter. Further Comments of MobileVision at Annex 5 (filed March 15, 1994). If that is the case, because Pinpoint is convinced that any interference from local-area systems such as AMTECH's would be completely manageable, as explained in the Hatfield Report, then Mobilevision has effectively assured the Commission that, contrary to its self-serving attacks on sharing, such sharing is completely feasible. While Pactel has, on two occasions, complained of interference from AMTECH-equipped systems, those situations were resolved. Subsequent to those events, PacTel submitted results of a field study results that illustrated the feasibility of sharing among wide-area and local-area systems. *See* Reply Comments of AMTECH Corporation, PR Docket No. 93-61, at 9-11 (filed July 29, 1993) *discussing* PacTel Teletrac, "Theoretical and Field Performance of Radiolocation Systems" at 10-13 and Figure 9 (June 25, 1993) submitted as appendix 2 to Comments of North American Teletrac and Location Technologies, Inc. (PacTel), PR Docket No. 93-61 (filed June 29, 1993) ("PacTel Comments").

First, MobileVision's analysis rests on the elementary mistake of equating detection of another system's signal with harmful interference. While perhaps understandable coming from a party that expects the Commission to clear out users from 8 MHz of shared spectrum for a system plagued by an "imminent capital infusion" for some time now,[12] these two concepts are completely distinct for soundly designed systems. When a Pinpoint mobile transmits its short duration pulses (which are typical of wide-area systems) in the vicinity of an AMTECH reader,[13] there is a possibility of "interaction," but the tests showed that there is no "loss of function" for the AMTECH system. This is because the AMTECH system was designed for shared spectrum operation and thus can operate efficiently under such conditions. The AMTECH protocol is designed to read a tag correctly even in the unlikely event that some of the data are lost.

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[12] Further Comments of MobileVision at 22 (filed March 15, 1994) (capital infusion "believed to be imminent"); Letter from John J. McDonnell and Marnie K. Sarver, counsel for MobileVision to Ralph H. Haller, Chief, Private Radio Bureau, dated February 1, 1994, at 5 (capital infusion "is" imminent). Eight months ago, MobileVision was making a similar claim. *See* Comments of MobileVision, PR Docket No. 93-61, at 16 (filed June 29, 1993) (in its comments, MobileVision claimed that its systems in Washington and Chicago were almost ready, but that the company was awaiting funding). MobileVision would have the Commission accord it virtually nationwide exclusivity in order to give its potential investors a windfall. Such a windfall approach would run counter to sound spectrum management and would unfairly limit the potential of other entities to serve the AVM marketplace.

[13] The comments filed in response to the *ex parte* presentations that address MobileVision's proposal to permit wide-area AVM systems to implement "ancillary" voice communications almost unanimously reject this proposal. *See* Comments of Southwestern Bell Mobile Services, PR Docket No. 93-61, at 13 (filed March 15, 1994); Comments of Mark IV at 8-9 (filed March 15, 1994). PacTel suggests in its comments that voice should be available for dispatch operation. Comments of PacTel at 9 (filed March 15, 1994). AMTECH submits that if the Commission permits voice for anything but true emergencies in frequencies other than "forward link" spectrum at the 902-928 MHz band edges, then the character of the wide-area service as a radiolocation service would inevitably be completely transformed into a cellular or PCS-type service.

Second, MobileVision misuses the plane earth propagation equation it employs,[14] which was intended to be used only under certain distance, height, frequency and ground conductivity for surface waves. When the distance is small, as it will be for wide-area and local-area system interaction, the equation used by MobileVision is inappropriate. As a result, MobileVision generally overestimates the received power and its conclusions regarding the degree of "interaction" between the two systems -- which, as discussed above, does not necessarily equate with interference -- are erroneous.[15]

III. PART 15 PROPONENTS GENERALLY DO NOT COMPLAIN OF UNACCEPTABLE INTERFERENCE FROM LOCAL-AREA OPERATIONS

Although a number of Part 15 commenters argue that the proliferation of AVM/LMS systems in the 902-928 MHz band will be detrimental to Part 15 users,[16] the general complaint is that *wide-area* AVM/LMS systems and Part 15 devices are incompatible. With only a few exceptions, the Part 15 commenters do not suggest that local-area AVM systems and Part 15 devices may be incompatible.[17] Indeed, Metricom discusses the general robustness of

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[14] *See* Further Comments of MobileVision at Annex 4, n.8 (filed March 15, 1994) *referring to* K. Bullington "Radio Propagation for Vehicular Communications," IEEE Trans. Veh. Technol., Vol. VT-26, no. 4, pp. 295-308 (Nov. 1977).

[15] In addition, MobileVision completely misconstrues the purpose of the quiet zones of AMTECH's Band Plan B, suggesting that they will be used to center illuminating frequencies at very low powers. Further Comments of MobileVision, Annex 5 at 1 (filed March 15, 1994). Rather, the local-area power limits in these are designed to accommodate "spill-over" from wideband local-area operations. *See* AMTECH Rule Making Comments at 20-31 & nn.61, 62. The same objective is behind AMTECH's proposed modification of PacTel's *ex parte* proposal to permit limited, very low power local-area operation below 912 MHz. AMTECH Ex Parte Comments at 9-10.

[16] *See* Comments of CellNet Data Systems, PR Docket No. 93-61 (filed March 15, 1994); Comments of Metricom, Inc., PR Docket No. 93-61 (filed March 15, 1994); Comments of KNOGO Corporation, PR Docket No. 93-61 (filed March 15, 1994); Comments of Itron, Inc., PR Docket No. 93-61 (filed March 15, 1994).

[17] Itron, KNOGO Corporation, and CellNet Data Systems express concern about the proliferation of all AVM/LMS operations.

existing Part 15 operations in the 902-928 MHz band, suggesting that neither local-area nor wide-area AVM systems have hindered the operation of Part 15 devices.[18] Similarly, the comments submitted by a coalition of twenty-three utility distribution companies ("Utilities Coalition") indicate that because of concerns of interference to and from Industrial Scientific Medical ("ISM") unlicensed radiators,[19] Part 15 devices must operate primarily in the 902-912 and 918-928 MHz bands, in which hundreds of local-area AVM systems are already in operation. Notably, the Utilities Coalition raises no complaint of interference in these bands.

AMTECH's experience as a local-area AVM operator also supports the conclusion that Part 15 and local-area AVM/LMS operations are compatible. AMTECH technology is used in over 1,000 AVM installations serving over a million vehicles. AMTECH users have never, to AMTECH's knowledge, complained of unacceptable interference from a Part 15 device, nor is AMTECH aware of complaints of unacceptable interference to a Part 15 operator. Further, numerous laboratory tests assessing the interference potential to AMTECH readers from Part 15 operations confirm the extremely small probability of interference from unlicensed devices.

Although the Commission has encouraged the development of unlicensed Part 15 operations in the 902-928 MHz band, the agency has consistently underscored its rule requiring

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[18] Comments of Metricom, Inc. at 16, 17 n.31 (filed March 15, 1994); *see also* Comments of TIA Mobile and Personal Communications, Consumer Radio Section, PR Docket No. 93-61, at 5 (filed March 15, 1994).

[19] *See* Comments of Ad Hoc Coalition of Utility Distributors, PR Docket No. 93-61, at 3, 7 (filed March 15, 1994). Interference to ISM from a Part 15 communications device is virtually inconceivable because Part 15 devices would almost never operate with sufficient power to affect an ISM use in which radio is employed not to communicate but rather to transform materials, typically through heating.

Part 15 devices to operate on a non-interference basis vis-a-vis licensed operations.[20] To help strike a reasonable balance between the continued successful operation of Part 15 devices and the responsibility of Part 15 operators vis-a-vis licensed systems, the Commission may want to further define "harmful interference" for purposes of operations in the 902-928 band. Such a definition could be based on the requirement that a licensed system must be able to tolerate a certain noise level in its receivers. The adoption of a specific definition of "harmful interference" in this context will prevent Part 15 operators from having to discontinue operating if the interference they cause is less than "harmful" or is caused to a licensed system with unreasonably fragile technological underpinnings.

IV. CONCLUSION

In conclusion, after reviewing the entire record in this proceeding, AMTECH remains convinced that its proposed Band Plan B best accommodates both wide-area and local-area operations. Accordingly, AMTECH urges the Commission to adopt this proposal. In the alternative, with the modifications described in AMTECH's comments, the band plan proposed by PacTel in its *ex parte* presentation could be acceptable. To meet the needs of local-area

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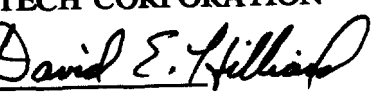
[20] *See, e.g.*, Amendment of Parts 2 and 15 of the Commission's Rules with Regard to the Operation of Spread Spectrum Systems, GEN Docket No. 89-354, 5 FCC Rcd 4123, 4124 (1990) (Report and Order); *see also* 47 C.F.R. § 15.5(b).

systems, however, the Commission should, if considering PacTel's proposal, modify it as AMTECH suggests.

Respectfully submitted,

AMTECH CORPORATION



Richard E. Wiley
David E. Hilliard
Edward A. Yorkgitis, Jr.
of
Wiley, Rein & Fielding
1776 K Street, N.W.
Washington, D.C. 20006
(202) 429-7000
Its Attorneys

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